

SEPSIDAE FROM THE AUSTRALASIAN REGION (Diptera)

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Two small collections of Sepsidae, made respectively by Clifford O. Berg and Jean Laffoon while they were engaged in malaria control work with the armed forces during the recent war, were generously turned over to the writer for determination, and an interesting lot of regional material belonging to the United States National Museum was also made available through the kindness of Curtis W. Sabrosky. Study of the material has brought to light two new species and one new subspecies, some synonymy, and some distributional data from little known areas.

KEY TO THE AUSTRALASIAN GENERA OF THE FAMILY SEPSIDAE

(Mesopleural bristle always present, although small in *Toxopoda* and *Perochaeta*. The Formosan genus *Myrmecosepsis* Kertész [1914, Ann. Mus. Nat. Hung. 12:244], not included below, was placed in the Chloropidae by its describer, but Hennig [1941: 131] has listed it with the Sepsidae; it is an almost wingless fly with long, erect, quill-like bristles on the dorsum).

- 1 (2). First and second basal cells of wing united; orbital bristles lacking; abdomen constricted behind second tergite; abdominal macrochaetae present
.....*Australosepsis* Malloch
- 2 (1). First and second basal cells separated3
- 3 (4) Thorax and abdomen dull black; abdomen with silvery pruinose bands; abdominal tergites lacking bristles and setae; humeral bristle minute; outer verticals (postoculars) lacking; one pair of DC*; lower margin of face projecting; middle femora of male bent in middle.....
.....*Toxopoda* Macquart
- 4 (3). Body usually shining, at least on parts of pleura; microsetae present, and often macrochaetae on abdomen5
- 5 (12). A pair of strong orbital bristles present; abdomen lacking macrochaetae except at tip, not or but slightly constricted behind second tergite; always only one DC; wings not spotted6

*The following abbreviations are used: DC - dorsocentral bristles of mesonotum; PV - postvertical bristles; tp - hind crossvein (*transversa posteriore*).

- 6 (7). PV lacking; one or two strong acrostichals behind the suture; humeral bristle present; preapical tibial bristles evident on middle and hind legs; male hind tibiae with dorsal slit or "cicatrix" *Xenosepsis* Malloch
- 7 (6). PV present; no strong acrostichals 8
- 8 (9). Humeral bristle lacking; vibrissae duplicate; male fore tibiae with ventral emargination bearing in its middle a broad, scraper-like tooth *Decachaetophora* Duda
- 9 (8). Humeral present; only one well developed vibrissa 10
- 10 (11). Wings distinctly gray; genal bristle strong; male hypopygium with forked lateral processes; fourth sternite tufted; female fore femora with a small anteroventral bristle at apical third *Parameroplus* Duda
- 11 (10). Wings hyaline or scarcely gray; genal bristle indistinct or lacking; male hypopygial processes simple, cruciate, with dense, long hairs and bristles on convex side; fore femora of female anteroventrally with four bristles (*M. beckeri*) or without bristles (*M. sauteri*)
..... *Meroplus* Rondani
- 12 (5). Orbital bristles lacking or very small; abdomen with or without preterminal macrochaetae, strongly constricted behind second tergite; usually two DC; wing with or without spots 13
- 13 (14). Humerals and postoculars lacking; no wing spots; one DC; abdomen without macrochaetae; male with peculiar lateral processes on fourth sternite *Perochaeta* Duda
- 14 (13). Humerals and postoculars present; wing spot present at tip of second vein or apically or wing unmarked or marked basally only 15
- 15 (16). Front, thorax, and legs with long hair; one DC; no abdominal macrochaetae *Lasionemopoda* Duda
- 16 (15). Front without hair; two DC (except in some species of *Sepsis*); wing spot and abdominal macrochaetae present or not 17
- 17 (18). Abdomen of the male always, and often of the female also, with distinct macrochaetae; wing spot, if present, only in vicinity of vein 2 *Sepsis* Fallén
- 18 (17). Abdomen of both sexes without distinct macrochaetae, although sometimes with somewhat stronger hairing of the tergal margins and with strong anal bristles; wing darkened along costa basally and sometimes with apical spot 19
- 19 (20). Wings blackened only at base; sternopleura shining anteroventrally *Dicranosepsis* Duda
- 20 (19). Wings with spot at or near tip; sternopleura wholly or partly pruinose *Parapalaeosepsis* Duda

The description of *Xenosepsis sydneyensis* Malloch (1925: 315) is insufficient to distinguish it from the generitype of *Pseudomeroplius* Duda (*P. acrostichalis* Duda, 1926a:11), the only point of difference being in the number of strong acrostichals. The latter genus is therefore considered synonymous.

The writer cannot distinguish two categories of generic rank in *Parapalaeosepsis* and *Poecilopterosepsis*: he accordingly considers the latter synonymous on the basis of page priority (Duda 1926a:42 and 43 resp.). The generitype of *Parapalaeosepsis* is *Sepsis plebeia* De Meijere, the sole originally included species. The known species, together with two new species and one new subspecies, may be separated in the male sex as in the following table. The species are characteristically New Guinean. Those examined by the writer (*P. apicalis*, *P. basifera*, *P. laffooni*, and *P. mesopla*) have a single distinct, posteriorly curved bristle at the apex of each hind coxa, weak and short in *P. mesopla*, but strong in the others.

KEY TO MALES OF THE GENUS PARAPALAEOSEPSIS

- 1 (2). Middle basitarsi compressed, much broader than second tarsal joint and furnished with scales; claspers pointed (Amboina; Aru Is.; New Guinea)*P. basifera* Walker
- 2 (1). Middle basitarsi slender, cylindrical, not greater in diameter than second joint3
- 3 (4). Middle femora armed beneath with strong spinules projecting apicad at an angle of 45° from tuberculiform bases; wings with median cloud (New Guinea).....
.....*P. mesopla* Steyskal
- 4 (3). Middle femora not armed as above; wings without median cloud5
- 5 (6). Middle basitarsi partly black; crossveins as far apart as 1.5 times length of *tp*; a basally directed spinule present between the two longer apically directed ones posteroventrally [Curran 1928:119]; Matema Id., Santa Cruz Group [Curran 1936: 31]; New Guinea; Lesser Sunda Is.; India; Ceylon; Formosa)*P. plebeia* De Meijere
- 6 (5). Middle basitarsi wholly yellowish, at most narrowly blackish at tip; crossveins not farther apart than length of *tp*7
- 7 (8). Fore tibiae distinctly emarginate medially; wing spot large, extending to or nearly to fourth vein; claspers spatulate at tip (New Guinea; Solomon Is.)
.....*P. apicalis* De Meijere
- 8 (7). Fore tibiae not emarginate; wing spot smaller9

- 9 (10). Wing spot large, extending from before tip of second vein to or shortly beyond third vein; claspers cultriform *P. laffooni* Steyskal
- a. Wing spot filling out tip of submarginal cell, extending into first posterior cell (New Hebrides) *P. laffooni laffooni*
- b. Wing spot roundish, not filling out tip of submarginal cell, extending only to third vein (New Caledonia) *P. laffooni noumeae* Steyskal
- 10 (9). Wing spot consisting of a band from before middle of second costal section to beyond end of third vein; claspers ? (New Guinea) *P. limbata* De Meijere

In the course of the writer's work on the material listed below he came to certain conclusions regarding synonymy of some of the species. He was pleased to find that Hennig, who admirably figured some of the diagnostic parts, came to similar conclusions in his work on the Lesser Sunda Islands material (1941a). The writer has used the distinctions tabulated below in making his determinations in the genus *Sepsis*.

KEY TO THE AUSTRALASIAN SPECIES OF THE GENUS SEPSIS*

- 1 (10). Wing entirely without spot at end of second vein; pteropleura sometimes pruinose 2
- 2 (5). Sternopleura anteroventrally strongly shining, not pruinose 3
- 3 (4). Abdomen rugulose, dully shining; middle tibiae with a strong bristle dorsally at the apical sixth; pteropleura partly pruinose; hind femora with a distinct ventral bristle near base; male fore femora with a very strong tooth-like projection slightly apicad of middle bearing a few crowded stubby spinules, closely apicad of which is a secondary tubercle bearing only small and weak bristles; male fore tibiae simple, straight or sinuate, unarmed; male hind femora clavate *S. indica* Wiedemann (*S. spectabilis* De Meijere)
- 4 (3). Abdomen scarcely rugulose transversely and strongly shining; middle tibiae at most with a small subapical bristle; pteropleura wholly shining; male fore femora with stout bristle at middle (mid-spine), immediately apicad of which is a rather broad tubercle bearing several stubby spinules; male fore tibiae sinuate below, armed with a curved row of spinules in basal half; male hind femora not clavate *S. lateralis* Wiedemann
- 5 (2) Sternopleura wholly pruinose 6

*Some species of Walker and Brunetti remain unelucidated.

- 6 (7). Pteropleura pruinose; abdomen shining; male fore femora and tibiae of *S. indica* type.....
.....*S. trivittata* Bigot; *S. decipiens* De Meijere
Hennig (1941a:146) considered *S. trivittata* a synonym of *S. indica*, and the writer suspects likewise of *S. decipiens*, but he lacks material.
- 7 (6). Pteropleura shining; male fore femora with a mid-spine, apicad of which is a more or less distinct tubercle; male fore femora armed with a row of spinules basiventrally....
.....8
- 8 (9). Male fore femora ventrally beyond the mid-spine with a large yellow apically spinulate process; male fore tibiae postero-apicad of the row of spinules with a short, thorn-like process; hypopygial processes slender and short.....
.....*S. tuberculata* Duda
- 9 (8). Male femora with a broad low hump furnished with several rather large spinules apicad of mid-spine; male fore tibiae basally with a short row of spinules immediately followed by a bare roundish swelling; hypopygial processes longer and stouter*S. coprophila* De Meijere
- 10 (1). Wings with a more or less distinct spot or spots in vicinity of end of second vein or directly over same; pteropleura shining11
- 11 (12). Sternopleura wholly pruinose; only one DC, rarely with weak second one; male fore femora of *S. punctum* type, with a small apically directed process in the emargination; hypopygial process short and broad
.....*S. latiforceps* Duda
- 12 (11). Sternopleura at least anteroventrally shining; two well developed DC13
- 13 (14). Distal section of third and fourth veins distinctly convergent; spot at tip of second vein unusually small and roundish; cheeks approximately as wide as third antennal joint; hind femora without bristles; male fore femora without anterobasal hairy patch, with a few spinules below in apical third; hypopygial processes with a small anterior tubercle, apicad of which they are curved forward C-wise*S. thoracica* Rob.-Desv.
- 14 (13). Distal section of third and fourth veins almost parallel; male fore femora with anterobasal patch of hair, without spinules below in apical third15
- 15 (16). Wing tip, except the veins, whitish, the dark spot elongate, diffuse, cheeks half as wide as third antennal joint; male hind femora with anterodorsal preapical bristle
.....*S. albopunctata* Lamb
- 16 (15). Wing tip not whitish; cheeks approximately as wide as third antennal joint; male hind femora without bristles....
.....*S. barbata* Becker

NOTES ON MATERIAL EXAMINED

AUSTRALOSEPSIS NIVEIPENNIS Becker

SOLOMON IS.: New Georgia, September 4 (C. O. Berg).

NEW HEBRIDES: Espiritu Santo, Second Channel, November 4, 1943. (J. Laffoon).

Duda (1926:31) referred this species to his genus *Saltelliseps*. In the previous year Malloch (1925:514) described *Australosepsis fulvescens* and a variety *atratura*, which are apparently the same as Becker's species. Malloch suggested the specific and stated the generic synonymy (1928:307; 1928a:611), and Hennig (1941a:146) has made the combination. The males of our material are nearly all of a yellowish or reddish color, while the females are black. A similar condition is found in *A. tenella* De M. (v.i.). *A. niveipennis* is known from several localities in Africa (Morocco, Egypt, Abyssinia, Togo), Formosa, Lesser Sunda Is., Philippine Is., and Australia.

AUSTRALOSEPSIS TENELLA De Meijere

PHILIPPINE IS.: Los Baños, Luzon (Baker); Puerto Princesa, Palawan, August 12, (R. C. McGregor), both in USNM.*

Hennig (1941a:146) found the proportion of red to black males to be 45:12. Our material is approximately in that proportion also, but intermediates make it difficult to make a numerical statement. The species is known from Ceylon, Singapore, Lesser Sunda Is., Philippine Is., Formosa, and New Caledonia.

DICRANOSEPSIS BICOLOR Wiedemann

SUMATRA: Blang Rakal, NGS SI Exp. 1937 (Mann), in USNM.

PHILIPPINE IS.: Manila, October, 1924 (R. C. McGregor, Robert Brown); Limay, Bataan (R. C. McGregor); Puerto Princesa, Palawan, August 12, 1925 (R. C. McGregor), all in USNM.

RYUKYU IS.: Okinawa Id., June 22 to July 12, 1945 (W. G. Field, F. N. Young), in USNM.

MARIANA IS.: Point Oca, Guam, May, 1945 (G. E. Bohart and J. L. Gressitt); Asan, Guam, Jan. 31, 1948, near carabao dung (K. L. Maehler); Inarajan, Guam, December, 1947, on carabao dung, all in USNM.

*United States National Museum.

NEW GUINEA: Cyclops Mts., 1000 ft. (J. Laffoon); Finschhafen, November 9, 1944 (D. G. Hall), in USNM.

SOLOMON IS.: Guadalcanal, September 10, 16, November, 1944 (C. O. Berg); New Georgia (Berg).

NEW HEBRIDES: Espiritu Santo, Second Channel, August, 1944 (J. Laffoon).

It has not been feasible to distinguish any of the many named "varieties" in the present material. The distinctions cited by Duda (1926:47; 1926a:54) apparently occur within populations; all forms, for example, are cited from Formosa (cf. also Hennig 1941:131). Hennig (1941a:146) considered it advisable to treat them as "Formen einer Art."

The species is known from India to Formosa and southward to New Guinea, but apparently not yet from Australia. Curran (1936:32) recorded it as *Sepsis javanica* De M. from San Cristoval Island in the Solomons and Matema Island in the Santa Cruz group.

LASIONEMOPODA HIRSUTA De Meijere

AUSTRALIA: Botany Bay and Blawarra, New South Wales (H. Peterson), in USNM.

An easily recognized species thus far recorded only from Botany Bay, Sydney, Parramatta, and Como, all in New South Wales.

PARAPALAEOSEPSIS APICALIS De Meijere (Figure 1a)

NEW GUINEA: Finschhafen, April 9, 1944 (E. S. Ross), in California Acad. Sci.

SOLOMON IS.: Guadalcanal (C. O. Berg); l.c., November, 1944 (J. Laffoon), in USNM.

The reasons for referring this species to *Parapalaeosepsis* have been given above. The species has been previously found only in New Guinea (S. E. Paumomu River and Astrolabe Bay).

PARAPALAEOSEPSIS BASIFERA Walker

NEW GUINEA: Cyclops Mts., 1000 ft., March, 1945 (J. Laffoon), in USNM.

Known from Amboina, Aru Is., and New Guinea (Paumomu River).

Parapalaeosepsis laffooni Steyskal, new species
(Figure 1b, c)

Male and Female—Length 3.4 mm. Very similar to *P. apicalis* De M. and *P. limbata* De M., differing as shown in the foregoing key. Purple-black in color, except parts of the legs as follows: fore legs as far as middle of third tarsal joint; middle and hind legs as far as basal fourth of femora, the transition to black rather gradual; apical fourth of middle tibiae, also with gradual transition; middle tarsi to middle of third joint; these parts yellowish. Middle basitarsi equal in length to remainder of tarsi, slender and cylindrical. Sternopleura strongly pruinose except on the shining lower anterior aspect. Posterior half of pteropleura also pruinose. Wings hyaline except small basal area and large apical brown area, as in figure.



Wing of *Parapalaeosepsis apicalis* DeM., male showing extent of apical spot in A) *P. apicalis* DeM., male; B) *P. laffooni* n. sp., male; C) *P. laffooni* n. sp., female.

Male—Hypopygium with cultriform processes, rather sharply pointed at tip. Fore femora and tibiae in posterior view very similar to those of *P. basifera* Wlk., as figured by Duda (1926a:105, pl. VIII, fig. 68a), the anterior face with two small, more distinct setulae near base, slightly basad of middle with one large and two moderate posteroventral spines (the latter of which are half as long as the former) and one anteroventral spine nearly as long as the large posteroventral. Fore tibiae not emarginate medially.

Holotype, male, NEW HEBRIDES, ESPIRITU SANTO ISLAND, Second Channel, July, 1944, no. 143 (Jean Laffoon), and *Allotype*, female, same data, no. 138, in USNM, type no. 58802; *Paratypes*, same data, nos. 135, 138, 139, one pair in the author's collection, the remainder in the collection of Jean Laffoon.

Parapalaeosepsis laffooni noumeae Steyskal, new subspecies

Male and Female—Similar to the typical form, but with a reduced wing spot. In the male the spot barely attains the third vein posteriorly and toward the wing tip only shortly beyond the tip of vein 2, leaving an appreciable area in the tip of the sub-

marginal cell hyaline. The wing spot of the female is but very slightly smaller than in the typical subspecies.

Holotype, *Allotype*, and four female *Paratypes*, NEW CALEDONIA, NOUMEA, July 24, 1944 (Wilfred Crabb), no. 58803 in USNM.

Parapalaeosepsis mesopla Steyskal, new species

Male—Length 5.1 mm. An aberrant species, distinguished as in the foregoing key.

General color black. Fore legs yellow, except for rather brownish femora and two black ultimate tarsal joints. Hind femur gradually becoming yellowish in the basal fifth and middle tibiae also a little brownish toward tip. Only a basal part of one middle basitarsus is preserved; this and the basal two joints of the hind tarsi are yellowish. Face also rather yellowish. Antennae beyond the first join missing.

Mesonotal disc brownish pruinose, humeri, propleura, stripe above the fore coxae, lateral aspect of sternopleura, and the entire pteropleura, bluish white pruinose. Hypopygium (well turned in) yellowish.

Wings hyaline, costal cell and root area blackish, a diffuse light brown cloud over *tp* and extending into submarginal cell, wing tip from before second vein to beyond fourth vein broadly dark brown, membrane between the median cloud and the brown tip whitish.

Fore femora straight above, below sloping in a straight line to each end from a neatly median group of four rather small spines on a tiny tubercle. Fore tibiae straight, somewhat tumid in apical two-fifths, where they are furnished with many fine erect hairs, some of which are also present on all joints of fore tarsus. Middle femora equal in length to hind, but a little heavier and furnished below with a double row of short but stout spinules placed on tuberculiform bases and directed approximately 45° apicad. Apical two-fifths of middle tibiae bearing on ventral and posterior surfaces a group of about 16 macrochaetae, each about as long as diameter of tibia.

Apparent first abdominal segment with a pair of strong lateral bristles and a group of ten rather long dorsal ones. Abdomen somewhat collapsed apically, but shining and furnished with coarse hairs and at least a pair of strong macrochaetae on the dorsum of hypopygium.

Holotype, male, CYCLOPS MTS., NEW GUINEA, 1000 ft., March, 1945 (Jean Laffoon), in USNM, type no. 58804.

SEPSIS ALBOPUNCTATA Lamb

NEW HEBRIDES: Espiritu Santo, Second Channel, January 2, July August, 1944 (J. Laffoon); l.c., September, 1944 (K. L. Knight), in USNM.

Sepsis hirtifemur Malloch (1925:312) is apparently synonymous. The species is known from Eastern Africa, Madagascar, Seychelles Is., Australia (New South Wales), and Lesser Sunda Is.

SEPSIS INDICA Wiedemann

PHILIPPINE IS.: Los Baños (Baker); Manila; Limay, Bataan; Silang, Cavite (all R. C. McGregor), all in USNM; Puerto Princesa, Palawan, August 12, 1925 (R. C. McGregor), in USNM.

The writer agrees with Hennig (1941:146) that *S. spectabilis* De Meijere is synonymous and believes it likely that *S. trivittata* Bigot and *S. decipiens* De Meijere may be also. Curran (1936:31) recorded a single female of *S. spectabilis* from Bellona Id. in the Solomons. Other records place it as widespread in the Australasian region east to New Guinea and the Philippine Is.

SEPSIS LATERALIS Wiedemann

RYUKYU IS.: Okinawa Id., 1945 (W. D. Field), in USNM.

PHILIPPINE IS.: Manila (Robert Brown), in USNM.

The species is a widespread one in the Mediterranean region and the Near East, Africa, Madagascar, India, China, Formosa, and New Guinea.

SEPSIS TUBERCULATA De Meijere

PHILIPPINE IS.: Victorias, Occ. Negros, September 19, 1927 (W. D. Pierce); Puerto Princesa, Palawan (R. C. McGregor), both in USNM.

Known from Ceylon, Java, Formosa, Australia (North Queensland), and Lesser Sunda Is.

TOXOPODA NITIDA Macquart

SUMATRA: Brastagi, May (F. J. Meggitt), in USNM.

NEW GUINEA: Finschhafen, September 9, 1944 (D. G. Hall), in USNM.

SOLOMON IS.: New Georgia; Guadalcanal (C. O. Berg).

The writer believes that this is the only known species of *Toxopoda* and that *T. atrata* Malloch (1928:308; 1928a:611) is a synonym. It is known from North and Central Africa, India, China, Formosa, Philippine Is., Lesser Sunda Is., and Australia (Queensland).

It seems pertinent to mention that no Sepsidae have been

recorded in the British Museum's monumental work on the insects of Samoa and that Bezzi (1928) recorded none from Fiji.

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ANOTHER RECORD OF FLEBOTOMUS IN CALIFORNIA

(Diptera: Psychodidae)

In September of 1947 two specimens of the genus *Flebotomus* were taken within my residence at 960 Vermont Street, San Jose, Santa Clara County, California. Both specimens were given to Dr. M. A. Stewart of the University of California. On May 24, 1948, another specimen was caught flying to a lamp in my apartment. Using the descriptions given by Mangabeira, O. F. and P. Galindo (*The Genus Flebotomus in California*, American Journal of Hygiene 40(2): 182-195, 3 pl. 1944) this specimen, a male, was determined to be *Flebotomus vexator* Coq., previously recorded from creek beds and ground squirrel holes in Alameda and Contra Costa Counties.—CHARLES P. HOYT, *Stanford University, California*.